

WHAT IS CLAIMED IS:

1. A prosthesis for repair of an aortic aneurysm at least partially in the ascending aorta, the prosthesis being tubular and having a proximal end and a distal end and being formed from a biocompatible material, the proximal end being adapted to be surgically fastened adjacent and around the aortic heart valve of a patient and the distal end being adapted to extend into the descending aorta, the distal end including at least one self-expanding stent.
2. A prosthesis as in Claim 1 wherein the distal end of the prosthesis has an internal self expanding stent and a further uncovered self expanding stent extending therefrom.
3. A prosthesis as in Claim 2 wherein there is provided barbs on the uncovered self expanding stent.
4. A prosthesis as in Claim 1 wherein the tubular prosthesis is formed from a corrugated biocompatible material and is of varying diameter depending on what portion of the aorta it is intended to be deployed into.
5. A prosthesis as in Claim 1 wherein the prosthesis includes side branches or a portion adapted for connecting side branches where other major arteries extend from the aorta particularly in the region of the aortic arch.
6. A deployment device for an aortic prosthesis adapted to repair an aneurysm at least partially within the ascending aorta, the prosthesis being as described above, the deployment device including a central

catheter extending from a proximal end to a distal end, the proximal end being adapted to remain outside a patient and the distal end being adapted to be inserted into the descending aorta of a patient, a nose cone on the distal end of the central catheter, the nose cone including means to retain
5 the distal end of the prosthesis with the assistance of a trigger wire, and a deployment catheter co-axially around the central catheter and slidable longitudinally with respect to the central catheter and means to lock the movement of the deployment catheter with respect to the central catheter, the deployment catheter extending from adjacent the nose cone to a
10 position which in use is outside the patient.

7. A deployment device as in Claim 6 wherein the deployment device further includes a manipulator sheath co-axially around the deployment catheter and slidable therealong, the manipulator sheath including a fixing boss at a distal end thereof adapted to retain the proximal
15 end of the prosthesis and a grip at a proximal end thereof which is adapted to remain outside the patient in use, the grip being provided to enable manipulation of the manipulation sheath with respect to the deployment catheter.

8. A deployment device as in Claim 6 further including a trigger
20 wire arrangement adapted to retain the distal end of the prosthesis within the nose cone of the deployment device.

9. A deployment device as in Claim 8 wherein the trigger wire is also adapted to retain the internal self-expanding stent in a retracted position about the deployment catheter.

25 10. A deployment device as in Claim 6 wherein the nose cone is in the form of a proximally opening capsule which is adapted to retain the

uncovered stent in a contracted condition and thereby also retain the barbs within the capsule before the uncovered stent is released.

11. A deployment device as in Claim 6 wherein the prosthesis tube is held at the distal end of the deployment catheter to extend back over the catheter and then is turned back inside itself to be fastened to the fixing boss on the manipulation sheath.

12. A deployment device as in Claim 6 wherein the means to lock the deployment catheter with respect to the central catheter is a pin vice.

13. A deployment device as in Claim 6 further including means on the proximal end of the deployment catheter to retain the external end of the trigger wire and release the trigger wire as required.

14. A deployment device as in Claim 6 further including a haemostatic seal between the deployment catheter and the manipulation sheath at its proximal end.

15. A method of deploying a prosthesis within the thoracic arch area of the aorta to repair an aortic aneurysm at least partially within the ascending aorta, the prosthesis being as discussed above and using a deployment device of the type discussed above, the method including the steps of;

(1) revealing the aorta and making an incision therein in the region of the aortic arch,

(2) inserting the deployment device into the incision and extending the deployment device into the descending aorta to a required distance,

(3) surgically joining the prosthesis intermediate its ends circumferentially to the aorta distally adjacent of the incision,

(4) releasing the distal end of the prosthesis to enable it to engage with the wall of the descending aorta,

5 (5) withdrawing the deployment device and releasing the proximal end of the prosthesis from the deployment device,

(6) feeding the prosthesis into the ascending aorta through the incision and surgically fastening the proximal end of the prosthesis around the aortic heart valve and fastening the prosthesis around the branch
10 arteries.

16. A method as in Claim 15 wherein the step of releasing the distal end of the prosthesis includes the steps of withdrawing the trigger wire to release the internal self-expanding stent while holding the external self-expanding stent within the nose cone of the deployment device, releasing
15 the locking means and advancing the nose cone distally to release the external stent from the nose cone capsule to enable the external stent to expand so that the barbs engage the walls of the descending aorta and retracting the nose cone to the deployment catheter tip.

17. A method as in Claim 15 wherein the step of withdrawing the
20 deployment device may include the step of moving the manipulator sheath proximally with respect to the deployment catheter.

18. A method as in Claim 15 wherein the step of advancing the nose cone distally to release the external stent from the nose cone capsule includes the step of retaining the internal self-expanding stent during the
25 advancing.

19. A prosthesis mounted on a deployment device, the prosthesis being tubular and having a proximal end and a distal end and being formed from a biocompatible material, the proximal end being adapted to be surgically fastened adjacent and around the aortic heart valve of a patient and the distal end being adapted to extend in use into the descending aorta, the distal end including at least one self-expanding stent, the prosthesis being everted and the proximal and distal ends of the prosthesis being fastened to the distal end of the deployment device with the proximal end within the distal end and a central portion of the prosthesis extending proximally.

20. A prosthesis mounted on a deployment device as in Claim 19 wherein the central portion is mounted to a manipulator on the deployment device.

21. A prosthesis mounted on a deployment device as in Claim 19 wherein the distal end of the prosthesis has an internal self expanding stent and a further uncovered self expanding stent extending therefrom.

22. A prosthesis mounted on a deployment device as in Claim 21 wherein there are provided barbs on the uncovered self expanding stent.

23. A prosthesis mounted on a deployment device as in Claim 19 wherein the tubular prosthesis is formed from a corrugated biocompatible material and is of varying diameter depending into what portion of the aorta it is intended to be deployed.

24. A prosthesis mounted on a deployment device as in Claim 19 wherein the deployment device includes a central catheter extending from a proximal end to a distal end, the proximal end being adapted to remain

outside a patient and the distal end being adapted to be inserted into the descending aorta of a patient, a nose cone on the distal end of the central catheter, the nose cone including means to retain the distal end of the prosthesis with the assistance of a trigger wire, and a deployment catheter
5 co-axially around the central catheter and slidable longitudinally with respect to the central catheter and means to lock the movement of the deployment catheter with respect to the central catheter, the deployment catheter extending from adjacent the nose cone to a position which in use is outside the patient.

10 25. A prosthesis mounted on a deployment device as in Claim 24 further including a trigger wire arrangement adapted to retain the distal end of the prosthesis within the nose cone of the deployment device.

26. A prosthesis mounted on a deployment device as in Claim 24 wherein the trigger wire is also adapted to retain the internal self-
15 expanding stent in a retracted position about the deployment catheter.

27. A deployment device as in Claim 24 wherein the nose cone is in the form of a proximally opening capsule which is adapted to retain the uncovered stent in a contracted condition and thereby also retain the barbs within the capsule before the uncovered stent is released.